

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

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|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Applicant's or agent's file reference CH2894PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US 03/26329 | International filing date (day/month/year) 21.08.2003 | Priority date (day/month/year) 21.08.2002 |
| International Patent Classification (IPC) or both national classification and IPC D06M13/513 | | |
| Applicant E.I. DU PONT DE NEMOURS AND COMPANY et al. | | |

1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.
 - This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
 - I Basis of the opinion
 - II Priority
 - III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV Lack of unity of invention
 - V Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI Certain documents cited
 - VII Certain defects in the international application
 - VIII Certain observations on the International application

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Date of submission of the demand 19.03.2004 | Date of completion of this report 26.11.2004 |
| Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized Officer Koegler-Hoffmann, S Telephone No. +49 89 2399-8611 |



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US 03/26329

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-13 as originally filed

Claims, Numbers

1-9 received on 28.06.2004 with letter of 28.06.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|------|--------|-----|
| Novelty (N) | Yes: | Claims | 1-9 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-9 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-9 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US 03/26329

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1) The following documents were cited in the Search Report:

D1: WO 95/23804 A
D2: WO 02/31062 A
D3: WO 01/90267 A

2) The application addresses the problem of finding fibres and textile products made thereof, which are endowed with good heat resistance and durability with no loss of hand and which have also good stainproofing performance.

3) The problem is solved by the combination of features of independent claim 1, which define a fibre which has coated thereon a thin film wherein said thin film has a specific thickness and comprises specific compounds.

4) Since none of the documents D1 to D3 cited in the Search Report discloses explicitly a fibre or textile product which is coated with a thin film having a thickness of less than 1000 nm the subject matter of independent claims 1, 5 and 7 seems to fulfil the requirements of Article 33(2) PCT.

5) It follows from documents D1 to D3 that it is already known in the art to use an aqueous emulsion comprising a fluorocarbon silane, water and optionally a surfactant to provide coated products having improved water and oil repellency, heat resistance and durability.

There is, however, neither a hint in one of said documents to provide a very thin film coating nor a hint that such a thin film coating would solve the problem posed.

Thus, in view of D1, D2 and D3 the subject matter of independent claims 1, 5 and 7 seems to fulfil the requirements of Article 33(3) PCT.

Claims 2 to 4, 6, 8 and 9 are dependent on claims 1, 5 and 7 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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- 6) Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 to D3 is not mentioned in the description, nor are these documents identified therein.

The description is not in conformity with the claims as required by Rule 5.1(a)(iii) PCT.

DruckexemplarCLAIMS

1. A composition comprising a fiber which comprises or has coated thereon a thin film wherein said thin film has a thickness of less than 1000 nm, preferably less than 500 nm, and comprises or is produced from a fluorocarbon silane or an emulsion, said emulsion comprises or is produced from (1) a fluorocarbon silane or its hydrolyzate, (2) water, and (3) optionally a surfactant, an alkoxy silane compound, catalyst, or combinations of two or more thereof; said fluorocarbon silane has the formula $R_f(CH_2)_p-Si\{-(O-CH_2CH_2)_n-OR^1\}_3$; R_f is a C_{3-18} perfluoroalkyl group or combinations of two or more thereof; each R^1 is independently one or more C_{1-3} alkyl groups; p is 2 to 4; and n is 2 to 10.
2. The composition of claim 1 wherein said thin film further comprises, or is produced from, a copolycondensate of said fluorocarbon silane, said surfactant, and said alkoxy silane.
3. The composition of claim 1 or 2 wherein said fiber is an aromatic polyamide fiber, an aromatic polyester fiber, a heterocyclic aromatic fiber, or combinations of two or more thereof.
4. The composition of claim 3 wherein said fiber is a p-phenylene terephthalamide fiber.
5. A textile product comprising or produced from a fiber wherein said fiber is as recited in claim 1, 2, 3, or 4.
6. The product of claim 65 wherein said product is a woven product, a knit product, a nonwoven fabric, or combinations of two or more thereof; and is preferably a woven fabric for protective clothing, a firefighting apparel, or a glove.
7. A process comprising (1) combining a fluorocarbon silane or its hydrolyzate, water, and optionally a surfactant, an alkoxy silane compound, catalyst, or combinations of two or more thereof to produce a mixture; (2) optionally heating said mixture to produce an emulsion; and (3) producing a thin film of said emulsion onto a fiber wherein said thin film has a thickness of less than 1000 nm, preferably less than 500 nm; said thin film is as recited in claims 1, 2, 3, or 4; said fluorocarbon silane having the formula $R_f(CH_2)_p-Si\{-(O-CH_2CH_2)_n-OR^1\}_3$; R_f is a C_{3-18} perfluoroalkyl group or combinations of two or more thereof; each R^1 is independently one or more C_{1-3} alkyl groups; p is 2 to 4; and n is 2 to 10.
8. The process of claim 7 wherein said fiber is an aromatic polyamide fiber, an aromatic polyester fiber, a heterocyclic aromatic fiber, or combinations of two or more thereof.

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9. The process of claim 8 further comprising producing a woven product, a knit product, a nonwoven fabric, or combinations of two or more thereof.